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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,762	11/13/2003	Yang Chin Cheng	MXIC-P910284	3582

7590 05/24/2006

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Irvine, CA 92618

EXAMINER

PHAM, THANHHA S

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 05/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

(A)

Interview Summary	Application No. 10/713,762	Applicant(s) CHENG, YANG CHIN	
	Examiner Thanhha Pham	Art Unit 2813	

All participants (applicant, applicant's representative, PTO personnel):

(1) Thanhha Pham. (3) _____.

(2) Kenton Mullin. (4) _____.

Date of Interview: 22 May 2006.

Type: a) ☒ Telephonic b) ☐ Video Conference
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☐ No.
If Yes, brief description: _____.

Claim(s) discussed: 1, 17, 27.

Identification of prior art discussed: Liao et al.


Agreement with respect to the claims f) ☐ was reached. g) ☐ was not reached. h) ☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Discuss proposed amendments to independent claims 1, 17 and 27 to overcome rejection dated 2/21/2006 (see attachment). Examiner will reconsider, conduct further search and examine the application on merit. Examiner also suggests using consistent claimed language to the dependent claims to clarify scope of claims.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.


Examiner's signature, if required

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Interview Summary

Pham, Thanhha

From: Kenton R. Mullins [krm@patlawyers.com]
 Sent: Monday, May 22, 2006 3:06 PM
 To: Pham, Thanhha
 Subject: RE: App. No. 10/713,762

Dear Thanhha,

Please see below.

Kindly,

Kenton R. Mullins
 Stout, Uxa, Buyan & Mullins, LLP

1. (Currently Amended) A method for forming a semiconductor device, the method comprising:
 - providing a substrate;
 - forming a material layer over the substrate;
 - forming a photoresist layer over the material layer;
 - exposing a top surface of the photoresist layer to a treatment radiation to generate separate photoresist structures having first distances between corresponding points of the separate photoresist structures defining a first pitch;
 - forming a protectant layer over the ~~photoresist layer~~ ^{separate photoresist} structures of the photoresist layer;
 - removing a portion of the protectant layer to expose an underlying portion of the photoresist layer;
 - removing the photoresist layer to form at least part of the protectant layer into separate protectant structures having second distances between corresponding points of the separate protectant structures defining a second pitch, the second pitch being less than the first pitch; and
 - removing portions of the material layer using the protectant layer as a mask.
17. (Currently Amended) A method comprising:
 - providing a substrate having a first layer formed thereon;
 - forming a second layer on the first layer;
 - performing a treatment on the second layer to form at least part of the second layer into separate structures having first distances between corresponding points of the separate structures defining a first pitch, and forming a protection layer over the second layer;
 - removing a first portion of the protection layer to expose the second layer;
 - removing the second layer to form at least part of the protection layer into separate protection structures having second distances between corresponding points of the separate protection structures defining a second pitch less than the first pitch; and
 - using the protection layer as an etch mask, removing an exposed portion of the first layer.
27. (Currently Amended) A method for forming a semiconductor device having a reduced pitch, the method comprising:
 - forming a material layer on a substrate;
 - forming on the material layer a patterned photoresist layer ~~on the material layer~~ of separate photoresist structures having first distances between corresponding points of the separate photoresist structures

structures defining a first pitch;

exposing the patterned photoresist layer to ultraviolet radiation to alter at least one property of the patterned photoresist layer so that a cross-link degree of a portion of the patterned photoresist layer is reduced;

silylanizing the patterned photoresist layer in a gas phase or in a liquid phase by diffusing silylamine into the patterned photoresist layer and forming a silylated layer over the surface;

removing a first portion of the silylated layer to expose the patterned photoresist layer using an etching back process or a chemical mechanical planarization process;

removing the patterned photoresist layer using a plasma gas; *to form at least part of the silylated layer into separate silylated structures*
 using the silylated layer as an etch mask, removing an exposed portion of the material layer;
 and *separate structures*
 removing ~~a second portion of the silylated layer to form a plurality of separate material structures having second distances between corresponding points of the separate material structures~~ *the separate silylated structures thereby forming*
~~defining a second pitch which is less than the first pitch that and which is smaller than a~~
 photolithography process will allow.

silylated structures defining a second pitch, the second pitch being less than the first pitch

-----Original Message-----

From: Kenton R. Mullins [mailto:krm@patlawyers.com]

Sent: Monday, May 22, 2006 12:04 PM

To: Pham, Thanhha

Subject: App. No. 10/713,762

Dear Thanhha,

Please confirm receipt. Below are my proposed (informal) changes to the independent claims.

They seem to overcome the present rejections. I look forward to discussing the matter with you today at 1:30 PM EST.

Kindly,

Kenton R. Mullins

Stout, Uxa, Buyan & Mullins, LLP

1. (Currently Amended) A method for forming a semiconductor device, the method comprising:
 - providing a substrate;
 - forming a material layer over the substrate;
 - forming a photoresist layer over the material layer;
 - exposing a top surface of the photoresist layer to a treatment radiation to generate structures having a first pitch;
 - forming a protectant layer over the ~~photoresist layer~~ structures of the photoresist layer;
 - removing a portion of the protectant layer to expose an underlying portion of the photoresist layer;
 - removing the photoresist layer to form structures having a second pitch that is less than the first pitch; and
 - removing portions of the material layer using the protectant layer as a mask.
17. (Currently Amended) A method comprising:
 - providing a substrate having a first layer formed thereon;

forming a second layer on the first layer;
 performing a treatment on the second layer to form structures having a first pitch and
 forming a protection layer over the second layer;
 removing a first portion of the protection layer to expose the second layer;
 removing the second layer to form structures having a second pitch less than the first pitch; and
 using the protection layer as an etch mask, removing an exposed portion of the first layer.

27. (Currently Amended) A method for forming a semiconductor device having a reduced pitch, the method comprising:

forming a material layer on a substrate;
 forming a patterned photoresist layer on the material layer having a first pitch;
 exposing the patterned photoresist layer to ultraviolet radiation to alter at least one property of the patterned photoresist layer so that a cross-link degree of a portion of the patterned photoresist layer is reduced;
 silylanizing the patterned photoresist layer in a gas phase or in a liquid phase by diffusing silylamine into the patterned photoresist layer and forming a silylated layer over the surface;
 removing a first portion of the silylated layer to expose the patterned photoresist layer using an etching back process or a chemical mechanical planarization process;
 removing the patterned photoresist layer using a plasma gas;
 using the silylated layer as an etch mask, removing an exposed portion of the material layer; and
 removing a second portion of the silylated layer to form a plurality of structures having a second pitch which is less than the first pitch that and which is smaller than a photolithography process will allow.